



- from up to 50 mg of plant tissue – leaves, seeds, blossom, fruit, roots, flour
- **Low-Throughput format: single-step spin column-based purification of genomic DNA**
- **High-Throughput format: for single-step 96-well plate-based purification of genomic DNA**

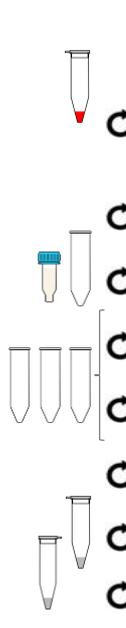
Genomic research and DNA analyses such as PCR and NGS require high-quality genomic DNA from quick procedures, no matter what the sample amount or source. The EchoLUTION Plant DNA Kits have been developed to obtain high-purity genomic DNA from all kinds of tissue and from amounts of starting material up to 30 mg. The purified DNA comprises of long DNA fragments, free of contaminants and enzyme inhibitors like chaotropic reagents and organic solvents and is highly suitable for all downstream applications.

### The EchoLUTION Plant DNA Kits provide

- **Highly efficient extraction & high DNA yield** – nearly 100 % recovery, even from difficult plant materials
- **Reliable downstream performance** in PCR and NGS – no re-work on samples
- **High detection sensitivity** due to greater purity – no carry-over of inhibitors
- **Fast and convenient process** – complete in less than 60 min, no tedious *bind-wash-elute* procedure
- **Sustainability at lower costs** – 70 % less plastic, no hazardous liquids, plastic-free packaging

### Faster preparation in half the time & fewer steps

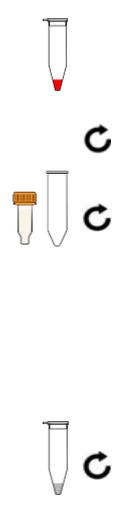
#### Silica *Bind-Wash-Elute*



1. Prepare buffers.
2. Add lysis reagents to tissue sample. Mix.
3. Incubate.
4. Short spin.
5. Add buffer, vortex.
6. Add ethanol, vortex.
7. Short spin.
8. Transfer sample to column.
9. Centrifuge.
10. Transfer to new tube. Add wash buffer 1.
12. Centrifuge.
12. Transfer to new tube. Add wash buffer 2.
13. Centrifuge.
14. Transfer to new tube.
15. Centrifuge.
16. Transfer to new tube. Add elution buffer, incubate.
17. Centrifuge. DNA is in eluate 1.
18. Transfer to new tube. Add elution buffer, incubate.
19. Centrifuge. DNA is in eluate 2.
- 20-21. Optional 3rd elution step.

**7 minutes hands-on time per sample**  
**8 centrifugation steps**  
**1 hour 56 minutes total time** (excl. buffer preparation)

#### EchoLUTION Plant DNA



1. Add TurboLyse protease and buffer to tissue sample. Mix.
2. Incubate.
3. Add Solution CS.
4. Short spin.

Meanwhile: Prepare column. Centrifuge.

5. Transfer sample to column.
6. Centrifuge. DNA is in eluate.

**3 minutes hands-on time per sample**  
**3 centrifugation steps**  
**37 minutes total time**

The innovative EchoLUTION workflow increases the convenience, speed and performance of genomic sample preparation significantly. Genomic DNA from any tissue sample is purified with less hazzle and in a fraction of the time compared to common Silica *bind-wash-elute* procedures. Yields per mg starting material from EchoLUTION reactions are close to 100% due to highly efficient TurboLyse sample lysis (patent pending) and a subsequent single-step purification process, avoiding harsh adsorption, washing and desorption steps.

**Consistently high yields from all plant tissue types**

Extraction of DNA from plant material typically starts with mechanical disruption of the plant tissue (e. g., bead-beating, mortar/pestle). The EchoLUTION Plant workflow then starts with the lysis step with TurboLyse enzymes: it takes place under physiological conditions where the enzyme activities are maximal. All kinds of tissue can be lysed fast and successfully – simple and with the same protocol. The subsequent EchoLUTION single-step spin purification procedure combines an initial filtration, holding back potential cell debris, with an extremely efficient reverse purification. The cleared lysate is directly loaded onto the spin column. The cleared lysate is directly loaded onto the spin column. After just one single spin, the purified genomic DNA is eluted with high yields while all impurities and salts are completely removed.

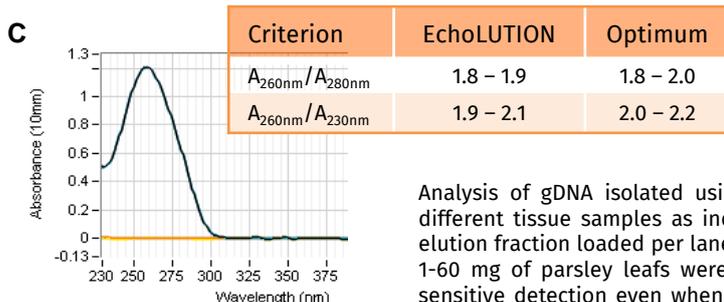
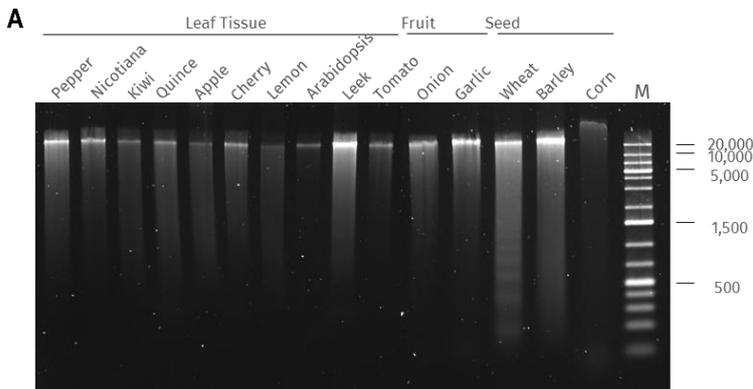
**Highest Purity – Maximal Reliability**

The EchoLUTION Plant DNA procedure delivers high-quality DNA:

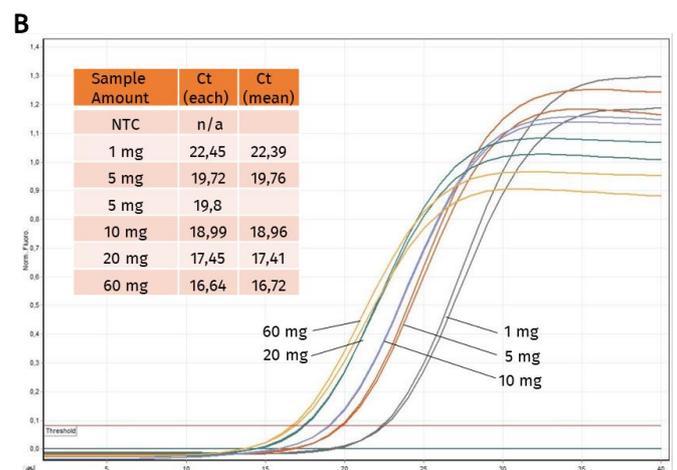
- High DNA fragment size: 30-50 kb
- Text book DNA purity:  $A_{260}/_{280}$  1.9
- Absence of amplification-inhibiting impurities

Downstream applications such as qPCR and NGS work reliably, re-work on single preparations is a thing of the past.

Species	Type of tissue	Typical DNA yield [ $\mu$ g]
Parsley	Leaf	8.0
Basil		2.6
Tomato		1.7
Potato		5.4
Apple		2.0
Kiwi		1.1
Quince		4.3
Morello Cherry		5.0
Lemon		1.1
Petunia		0.6
Orchid		0.5
Pine		0.3
Piceus		0.9
Cucumber		0.9
Leek		10.1
Bell pepper	0.9	
Arabidopsis	1.4	
Nicotiana	2.1	
Spinach	6.9	
Tomato	Fruit	1.2
Garlic		3.0
Onion		3.1
Wheat	Seed	2.8
Barley		5.1
Sun flower		2.6
Rape		2.3
Corn (maize)	0.9	
Parsley	Frozen Dried	1.7
Dill		5.7
Parsley		2.6
Dill		3.4



Typical yield of gDNA from 50 mg of different tissue types and species. Yield from 96-well high-throughput isolation is at least as high as from single-reaction isolation.



Analysis of gDNA isolated using the EchoLUTION Plant DNA Kit. **A**, Genomic DNA was purified from different tissue samples as indicated and DNA integrity assessed by agarose gel electrophoresis; 1  $\mu$ l elution fraction loaded per lane. M, DNA size marker. **B**, 2  $\mu$ l aliquots of gDNA preparations obtained from 1-60 mg of parsley leaves were applied in duplicates to qPCR detection (PR1 Gene). Ct values reflect sensitive detection even when using low sample amounts. **C**, Typical purity of EchoLUTION Plant gDNA fractions. Spectrophotometric analysis. DNA preparations are free of amplification inhibiting impurities.

The EchoLUTION workflow is based on aqueous solutions only – chaotropic reagents such as phenol, guanidine-hydrochloride (Gu-HCl), or organic solvents are omitted. Since wash steps are never complete, Silica preps consequently contain trace amounts of these substances as impurities whereas EchoLUTION samples are highly pure. This is confirmed spectrophotometrically (OD ratios, Figure and Table above), where BioEcho elution fractions typically show values within the optimum range. In addition, the EchoLUTION process removes all interfering substances originating from the sample which results in maximum purity and reliable OD readings.

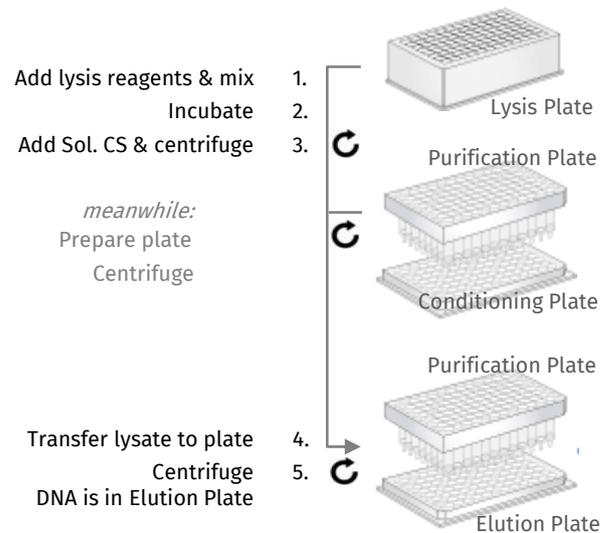
### Unmatched DNA extraction performance in High Throughput

For applications in plant research and molecular breeding, the EchoLUTION Plant DNA workflow can also be performed in high throughput. The process delivers the same high-quality DNA as from single reactions but within a fraction of the time and with only three centrifugation steps.

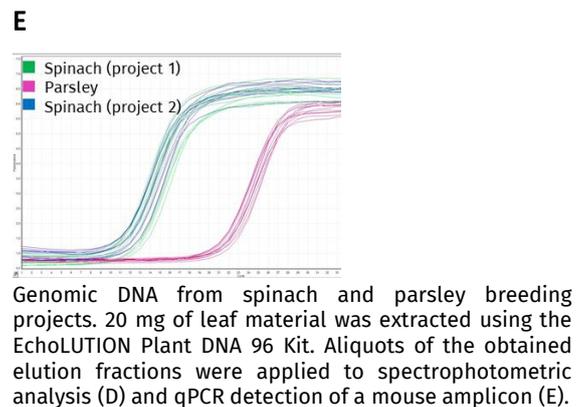
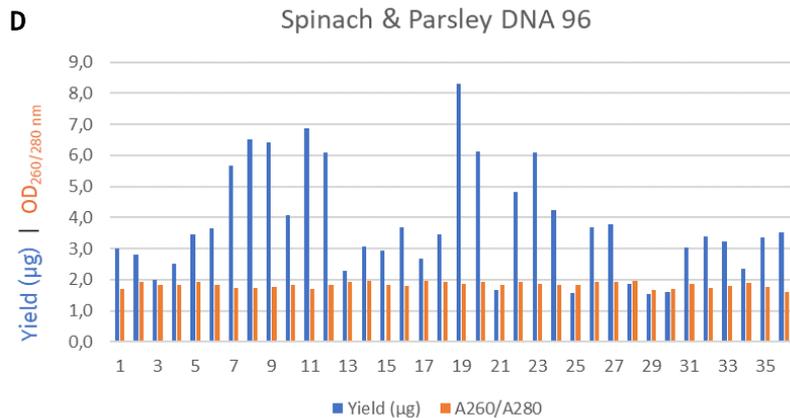
Following the lysis step, the lysate is centrifuged and the supernatant loaded onto the previously conditioned Purification Plate. The entire process is done after one additional centrifugation step.

The process is applied in plant breeding work in high throughput. Exemplary data from 96-well extractions with a large breeding company are shown below.

DNA is of consistently high purity and reliably detected in qPCR. There are no reaction drop-outs and there is no more need for a re-work on individual reactions!



**DURATION: 45 min**  
**5 min hands-on time, 2 centrifugation steps**



### Sustainable genomic research – 70% less plastic waste

Plastic waste produced from a Silica-based DNA kit and from an EchoLUTION kit (250 reactions each; including kit components and required consumables that are not part of the kits). Bags contained in BioEcho kits are cellophane-based. In numbers:

Waste	Silica	EchoLUTION
Hazardous liquid	80 ml	0
Plastic	540 g	170 g



## Ordering information

EchOLUTION Plant DNA Kits	Reactions	Product No.
<b>EchOLUTION Plant DNA Kit</b> For single-step spin column-based purification of gDNA from up to 50 mg of tissue (leaves, soft roots, seeds, fruit tissue, bud, blossom tissue), yielding up to 20 µg highly pure DNA suitable for all downstream applications	10 50 250	010-003-010 010-003-050 010-003-250
<b>EchOLUTION Plant DNA 96 Kit</b> For single-step 96-well plate-based purification of gDNA from up to 50 mg of tissue (leaves, soft roots, seeds, fruit tissue, bud, blossom tissue), yielding up to 20 µg highly pure DNA suitable for all downstream applications	2x 96 8x 96	010-103-002 010-103-008

BioEcho's growing portfolio of nucleic acid extraction kits and accessory reagents further comprises the product list below. For availability of test kits for additional applications, please refer to [www.bioecho.de](http://www.bioecho.de).

EchOLUTION nucleic acid extraction kits	Reactions	Product No.
<b>EchOLUTION Blood DNA Micro Kit</b> For single-step purification of genomic DNA from up to 60 µl liquid blood (human or animal) or dried blood (FTA cards) yielding up to 2 µg of highly pure DNA suitable for all molecular biology applications	10 50 250	010-001-010 010-001-050 010-001-250
<b>EchOLUTION CellCulture DNA Kit</b> For purification of genomic DNA from up to 2•10 <sup>6</sup> cultured cells (cell lines and primary cells), yielding up to 50 µg of highly pure DNA suitable for all molecular biology applications	10 50 250	010-006-010 010-006-050 010-006-250
<b>EchOLUTION Tissue DNA Micro Kit</b> For single-step purification of genomic DNA from 0.1 to 10 mg of human or animal tissue, yielding up to 40 µg highly pure DNA suitable for all molecular biology applications	10 50 250	010-002-010 010-002-050 010-002-250
<b>EchoCLEAN DNA &amp; RNA CleanUp</b>		
<b>EchoCLEAN DNA CleanUp Kit</b> (for desalting & removal of DNA/Primer < 50 bp)	50 250	020-002-030-050 020-002-030-250
<b>EchoCLEAN Organic Solvent DNA CleanUp Kit</b> (for single-step CleanUp of DNA from organic solvents in just 3 minutes)	50 250	020-002-040-050 020-002-040-250
<b>EchoCLEAN RNA CleanUp Kit</b> (for single-step CleanUp of RNA from organic solvents salts and chaotrophs in just 3 minutes)	50 250	020-002-050-050 020-002-050-250
<b>Buffers and Reagents</b>		
<b>EchoSAFE FFPE Deparaffinization Solution</b> Inert non-volatile solution enables rapid dissolution of paraffin. Allows working outside of the hood. With drop dispenser for fast and convenient dispensing.	5 ml 10 ml 100 ml	030-001-005 030-001-010 030-001-100
<b>PurifyLater Tissue Stabilizer</b> Stabilizes tissue samples for convenient storage and protection against breakdown by DNases and RNases.	100 ml 500 ml	030-002-100 030-002-500
<b>Lab Tools</b>		
<b>CeraTool Ceramic Blade Scalpels</b> (various blade shapes)	1	050-002-00x
<b>BioEcho Cap Puncher</b>	1	050-001-001